

³ Guier, W. H. and Weiffenbach, G. C. (1960). A satellite Doppler Navigation System, *Proc. Inst. Rad. Engrs.*, 48, 507.

⁴ Ashbrook, F. M. and Stevenson, D. D. (1960). The Navy's Portable Satellite Tracking Stations, *Trans. Inst. Rad. Engrs.*, SET-6, 41.

Dr. F. Graham Smith comments:

It is gratifying to note that the proposal for navigation by observation of an artificial satellite is being examined in more detail than in my paper. I certainly do not wish to take issue with Dr. Shinn about the rather more stringent requirements outlined in his note, except to comment that any relaxation of them leads only to a proportionate decrease of final accuracy rather than to a breakdown of the system.

The practical difficulties are in my opinion overestimated. Firstly, the transit satellites are already achieving a stability better than 1 part in 10^8 . Secondly the shipborne equipment could match this at a cost of a few hundred pounds only. Thirdly the Microlock receiver is not a complicated device, and the stringent requirements on transmitter power and receiver sensitivity need not bother us.

It is hard to see reason for further hesitation when the transit system is such an obvious success, and when it is clear that a network of transit satellites will actually be in orbit in a few years' time.

Dr. Shinn since writing his note has added (in proof) the following comment:

Some of my cautionary remarks are outdated by the remarkable success of the transit satellites. It appears that a practically useful system will soon be operational, and that the problems of making the shipborne equipment sufficiently cheap and reliable for general use deserve detailed investigation.

The Air Traffic Control Problem

from A. W. Southall
(*Wing Commander, R.A.F., ret'd.*)

ON page 240 of the April *Journal*, Wing Commander Dickie pointed out that in traffic control as we know it today, it is ground-speed and not air-speed that really matters. As he says, it is not possible for the pilot to maintain a constant ground-speed and it is for this reason that I suggest the concept whereby individual aircraft maintain constant power which, in the short term, must give constant air-speed. Slight changes in power will maintain a planned traffic pattern on any one route at any one height. Individual speeds will of course be different, and overtaking will have to be arranged by divergencies of track or height.

Where traffic streams converge in either the vertical or the horizontal plane, an interlace is obviously necessary. However, provided clearances are restricted

to the capacity of the routes, the interlace of converging streams will need only slight power changes by individual aircraft. If, as I have previously suggested, engine operating practice can be changed to allow power to be varied up as well as down, the interlace will become still easier to achieve.

Nothing in this concept prevents aircraft changing speed although of course control are entitled to fair warning of the intention. In practice, cruising speeds, let-down speeds, and approach speeds can be notified in advance, and the traffic pattern arranged accordingly.

The current control problem thus becomes the maintenance of safe spacing in individual streams and the arrangement of interlace or divergence as required. Wind is no longer a complication.

from T. F. Peppitt

WITH reference to Wing Commander Southall's note on 'The Effective Use of Airspace' in the April 'Forum', I would like to comment on certain points noted in his summary.

His first point, that of giving preferential treatment for aircraft showing superior airmanship, although excellent in theory is not, in my opinion practicable, at least not to the degree which he seems to envisage. However advanced navigational aids become, and however efficient their usage, the marginal operator of aircraft, with a shoestring budget will always be with us. In the interests of passenger safety a great proportion of the available controller time must be expended on this aircraft, which from the minimal standards of its operation is usually least suited to airborne delays. In certain cases the faster, more efficiently operated aircraft can be squeezed into a traffic pattern ahead of its less efficient competitors, but in congested areas preferential treatment of one type of aircraft would cause unjustifiable delays to others, unless 'substandard' aircraft have a separate landing pattern on to a separate runway. Few airfields possess the necessary runways. There is one other way to squeeze in aircraft ahead of others if a ground controller is unable to do so while maintaining the minimum approved radar or procedural separation, and that is for aircraft to maintain VFR flight from the time the separation standard is infringed until the overtaking aircraft is finally passed and clear. It is just the modern, efficient types of aircraft, requiring preferential treatment that are least able to maintain VFR flight.

The point is also made that height restrictions should be relaxed at every opportunity. This may be desirable from the operator's point of view, but in certain congested areas, such as terminal control areas, with traffic flying all ways at all times (even the best coordinated air lanes must cross) it could at best cause untold delay to aircraft on the ground, at worst be suicidal because of the all too numerous wildies, often high-speed service aircraft, who only recognize such airspace restrictions as the appropriate military authority shall see fit to recognize, but can be assumed to use quadrantal heights in most cases. When airspace is not congested there is rarely any advantage in relaxing height regulations, as they are then seldom unduly restrictive.

In a fluid traffic pattern in a busy zone to assign a set clearance for a set take-off time would place restrictions on all other aircraft in the area who were possible traffic. As the operation of aircraft cannot be timed-scheduled with the precision to merit this procedure, unless the booked clearance were well after the estimated loading time of the departing aircraft, there would be completely

unnecessary delays and restrictions, the total monetary loss of which would far outweigh any gain in faster routing procedures.

My private opinion, and here I speak not as the 'ace' controller, but as the average one that I am, is that if I am to provide a safe, efficient service to all aircraft under my control I can only consider the situation in being, and keep an orderly flow to the best of my ability. If I have as well, to bracket off heights and times for aircraft that are not yet airborne, or keep holes in a traffic pattern for certain favoured aircraft, my personal work-load could well be such that although the 'preferential treatment' was meted out, all traffic would be handled at a much slower rate, and the service given to all aircraft would deteriorate.

THE INTERNATIONAL SAIL TRAINING RACE

THE Executive Secretary gave a lecture to the assembled ships' officers in Oslo during the Sail Training Association's programme of events in July. Mr. Richey was navigating The Hon. Hugh Astor's *Nordwind*, which was entered by the Boy Scouts' Association and manned by Sea Scouts. The ship won the North Sea Race (Oslo to Ostend) in the fore-and-aft class for ships of over 50 tons.